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ABSTRACT

An exploration of the learning style differences between residents and faculty in a pediatric medical department resulted in a comparison of specialist and generalist orientations and the implications the differences might have for generalist education. The Kolb Learning Style Inventory was administered to 17 residents and 22 faculty members in a pediatric department of a training hospital and to 33 elementary school and 16 secondary school teachers in a university class. Concrete Experience (CE), Reflective Observation (RO), Abstract Conceptualization (AC), and Active Experimentation (AE) were derived from participants' ranking of selected words. Strongest areas were analyzed and compared through analysis of variance and chi square statistics. Residents and faculty were significantly different, residents preferring CE and AE, while faculty preferred AC. Elementary teachers (generalists) and secondary teachers (specialists) also had different results, with elementary teachers preferring CE and AE, while secondary teachers preferred AC. Elementary teachers and pediatric residents has similar scores, but elementary teachers and pediatric faculty had significantly different scores. These findings support a generalist versus specialist orientation. They may have implications for instructional design and delivery, teacher-learner relationships, and the recruitment, selection, and retention of primary care physicians. (Contains 4 figures and 15 references.) (Author/SLD)

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COMPARISON OF TWO LEARNING-STYLE STUDIES:

IMPLICATIONS FOR GENERALIST EDUCATION

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ABSTRACT

Background: An exploration into learning style differences between residents and faculty in a pediatric department resulted in comparing two studies in relation to a generalist vs. specialist orientation and the implications these differences might have for generalist education.

Method: The Kolb Learning Style Inventory was administered to 17 residents and 22 faculty in a pediatric department of a training hospital and to 33 elementary and 16 secondary teachers in a university class during 1992. Four scales, Concrete Experience (CE), Reflective Observation (RO), Abstract Conceptualization (AC) and Active Experimentation (AE), are derived from self-ranking of selected groups of words. Strongest areas were analyzed and groups compared using ANOVA and Chi square statistics.

Results: Residents and faculty were significantly different, residents preferring CE and AE while faculty preferred AC. Elementary (generalists) and secondary (specialist) teachers were significantly different, elementary teachers preferring CE and AE while secondary teachers preferred AC. Elementary teachers and pediatric residents were significantly alike. Elementary teachers and pediatric faculty were significantly different.

Conclusion: This supports a generalist vs. specialist orientation as do some medical studies using the same tool. This idea may have implications for design and delivery of instruction, teacher-learner relationships and recruitment, selection and retention processes for primary care physicians.

INTRODUCTION

As learners we approach the tasks of acquiring and using information in several different ways. There have been numerous attempts to identify categories into which types of learners can be grouped. These categories are often called learning styles.

Styles have been the focus of substantial research in education given their possible influence. Teachers' learning styles may affect the way they teach. Learning styles may influence how teachers and learners communicate and how teachers express expectations and understandings. Since individual students prefer to learn in different ways, they may learn easier under some conditions rather than others. People may best understand and get along with others having similar styles.

The Kolb concept of learning style chosen for this paper is based on a model of experiential learning[1]. The purpose of this paper is to report the results of two studies using a learning style inventory and the implications these results have for teaching, particularly in the generalist-oriented fields of primary care medicine. The results of a study in medical education using the Kolb Learning Style Inventory (LSI) raised some interesting speculation by the authors regarding differences between generalists and specialists. In order to explore these notions, another set of inventories completed by a group of current and future teachers were used for comparison.

THEORETICAL FRAMEWORK AND INSTRUMENTATION

Kolb defines learning as "...the process whereby knowledge is created through the transformation of experience."[1] Learning style is the "possibility-processing structures" which are conditioned by experience. People vary in how they take information in and

how they transform the information into meaning. The model is envisioned as a cycle with four points, two each at the ends of crossing diameters (or axes). The four points are 1) Concrete Experience (CE), 2) Reflective Observation (RO), 3) Abstract Conceptualization (AC) and 4) Active Experimentation (AE). CE - AC form the axis which reflects how information is grasped, while the RO - AE axis suggests the way information is transformed into knowledge (Figure 1). People who prefer **Concrete Experience** as a dominant learning strategy relate to the contextual and personal aspects of an experience. They are people-oriented. They emphasize feeling more than thinking, intuition more than the scientific process. **Reflective Observers** like to watch and observe situations. They are more intent on understanding than practically applying ideas. They value different points of view and tend to intuit the meaning and implications of situations. Those who are oriented toward **Abstract Conceptualization** emphasize thinking rather than feeling. They analyze ideas, build theories and plan systemmatically. **Active Experimenters** like to influence people and affect change. They put effort into doing rather than observing and are willing to risk to achieve their objectives. All the strategies are used by everyone to learn or solve problems, but different ones may be stronger for different individuals at different times and in different situations.

An instrument called the Learning Style Inventory (LSI) was developed by Kolb to elicit learning style preferences or modes. Kolb's original LSI consists of nine sets of four words. Participants are asked to rank the words for each set, valuing them from 4 to 1 with 4 being most characteristic of their learning style and 1 being least

characteristic. Four scales are then calculated from selected responses, revealing a person's relative emphasis on each of the four points of the experiential learning process.

Although the validity of Kolb's LSI has been questioned[2,3], a comparative factor analysis approach of four learning style instruments found that the Kolb LSI was the only one with a match between statistically calculated factors and learning style categories[4]. Kolb's own reliability data reports stability for up to three months, but may vary for an individual in different contexts. The LSI highlights preferences for individuals and also provides data for comparisons of groups. The author administered the LSI to four different groups in two settings: pediatric residents and faculty in a teaching hospital and elementary and secondary teachers in a university course.

STUDY 1: PEDIATRIC FACULTY AND RESIDENTS

The first study was undertaken to determine if residents and faculty have similar learning style preferences.

Methods: The LSI was administered to 17 residents and 22 faculty in a public, university-affiliated teaching hospital's pediatrics department on two separate occasions.

Four scores, CE, RO, AC and AE, were calculated for each respondent based on the sum of the values assigned to particular words of the nine items. Analysis of Variance was used to compare groups on each scale. The Chi square was used to compare dominant preferences of residents and faculty. The highest score was given a value of "1" and others, a "0". If there was no unique maximum, the value was split

evenly between or among scales. For example, if AE and AC scores were both highest with 15 points, each was given a .5.

Results: Faculty members held a significantly stronger preference for AC than residents (P=<.01), while residents demonstrated a significantly stronger preference for CE than faculty (P=<.03). Resident and faculty groups demonstrated significantly different dominant modes (P=.001). Seventy-seven percent (77%) of the faculty had AC as their dominant mode; residents were more heterogeneous with 40.5% CE and 40.5% AE as dominant modes. It is interesting to note that no one in either group had RO as a dominant mode. (Figure 2).

Discussion: Although faculty members completed the forms confidentially, results were shared informally. The author in attendance noted that the few faculty members with preferences for CE and AE were primarily in the ambulatory or general pediatrics division. Most of the faculty members participating were in one of the pediatric subspecialties, which might explain the overwhelming preference for the AC mode among faculty in the department. Other studies in medicine using Kolb's LSI [5,6] have concluded that there were similar learning style tendencies for residents and faculty in the same discipline. The idea of self selection into disciplines which support and accentuate one's preferences is supported by Kolb's studies[1]. This was not the case in the present study in which the residents exhibited different modes from the faculty group. It is possible that this difference may be the result of "generalist" versus "specialist" perspectives. "Generalist" are concerned with the whole or overall features of an area, while "specialist" refers to one who concentrates on only one part or branch

of a subject. General or primary care pediatricians deal with the whole person and refer to a specialist when a patient's problem is more specific and advanced. Residents, regard'ess of their future career plans, behave as generalists. They are required to take rotations in many divisions and provide general care for their ambulatory clinic patients.

STUDY 2: ELEMENTARY AND SECONDARY TEACHERS

A second study was conducted of university students who were current or future elementary and secondary teachers. Elementary teachers are generalists who deal with the whole child and are prepared to teach the early stages of all subjects. Secondary teachers, on the other hand, are specialists, credentialed to teach one or two subject areas with students in high school. Do current or future elementary and secondary teachers in the same educational psychology course have similar or different learning style preferences when analyzed using the Kolb LSI?

Methods : The students in two educational psychology classes were given Kolb's LSI. Combined they included 33 elementary and 16 secondary current or future teachers. As in the pediatric study, data analysis was performed on the teachers' learning preference data using the Analysis of Variance and Chi square methods for comparing the four modes and indicating dominant style by group.

Results: Elementary teachers held significantly stronger preferences than secondary teachers for CE (P=<.01). Secondary teachers held significantly stronger preferences than elementary teachers for AC (P=,.01). Fifty-nine percent (59%) of the secondary teachers had AC as their dominant mode, while the elementary teachers were more spread with 41% CE and 32% AE as dominant modes . These differences

were significant at the .04 level (Figure 3).

Discussion: The similarity of the results in these two studies appears to support the concept of a generalist learning mode preference which is different from that of specialists; the "generalists", i.e. residents and ambulatory faculty have similar preferences for CE and AE, while the "specialists," most of the pediatric faculty and more than half of the secondary teachers, preferred AC. A closer look, however, indicates that the residents and elementary teachers are more alike than the secondary teachers and the pediatric faculty.

STUDY 3: GENERALISTS AND SPECIALISTS

In order to see if the generalist vs. specialist differences could be supported, the data from the previous two studies were grouped for additional analysis. Will residents and elementary teachers have similar learning modes? Will faculty and secondary teachers have similar learning modes? Will elementary teachers have different learning modes from faculty? Will secondary teachers have different learning modes from residents?

Methods: The LSI scales from the four groups in the two studies were statistically analyzed. The Anova test followed by Tukey's Studentized Range Test was used to compare the groups on each scale. The Chi Square test was used to compare dominant style among groups.

Results: The elementary teachers, as well as being significantly different from the secondary teachers, were also significantly different from the pediatric faculty on the CE and the AC scales (P=<.05). Elementary teachers preferred CE more frequently

(41%) than pediatric faculty (7%), who preferred AC more (77% compared to 19% for the elementary teachers). The residents were not significantly different from the secondary teachers on the AC scale. There were no significant differences on the RO or AE scales among the groups. The elementary teachers and the pediatric faculty were different in dominant style (P=<.001). Overall, there was no difference between the elementary teachers and the residents and the secondary teachers and the pediatric faculty (Figure 4).

DISCUSSION AND IMPLICATIONS

The notion of the generalist versus specialist concept is supported by the results of the medical and teacher education comparisons. Though there was no significant difference between the residents and the secondary teachers, there was a dramatic difference between the pediatric residents and their faculty, particularly on the AC scale. The elementary teachers were different from both the secondary teachers and the pediatric faculty. The elementary teachers' preferences looked more like the residents, while the secondary teachers' preferences looked more like the faculty; the elementary teachers and residents had substantial scores in both the AE and CE categories, while the secondary teachers were almost 60% in the AC category. Secondary teachers, however, differed from pediatric faculty most notably in the percent who preferred CE (21% for secondary teachers, 7% for pediatric faculty).

In order to compare the studies presented here with others in the literature, it is necessary to describe another way of looking at Kolb's styles which other studies have used in their analysis. Complex styles are formed by combining the "elementary

strategies", one from each axis[1]. Two adjacent strategies become one of the following: Diverger, which combines Concrete Experience and Reflective Observation; Assimilator, which combines Reflective Observation and Abstract Conceptualization; Converger, which combines Abstract Conceptualization and Active Experimentation; or Accommodator, which combines Active Experimentation and Concrete Experience. The Accommodator style (AE and CE) fits the resident and elementary teacher generalists in the two studies reported above. Since the primary area of interest to the authors is medical education, a review of some of the pertinent literature will be limited to studies in medicine, which might illuminate the discussion of generalist vs.specialist learning styles.

The results of studies with family practice physicians, who might be considered the ultimate medical generalists, because they focus on the whole person and the whole family, is mixed. Some investigators found no predominant learning style[7], while other studies[8,9] found family physicians highest in the Accommodator and Converger styles, both of which incorporate Active Experimentation. A study of medical student career choice[8] found that choices of specialties by medical students were related to LSI scores, finding those who chose primary care were more often Accommodators. The same study also found those who chose internal medicine subspecialties were more often Convergers, preferring RO and AC. These findings support the generalist vs.specialist distinction.

The population of each of the studies was small, and in one study the generalist vs. specialist assessment was informal. Many of the studies did not state which version of

the LSI was used and reasons for using it varied. The different way of looking at the results, i.e. simple strategies rather than combined strategies, confound the comparisons somewhat.

Implications for Teaching: One of the main values of this or any similar instrument is the realization and appreciation of differences in learners. If we approach teaching from Lefrancois' definition of instruction, "To instruct is to exercise control over some of the learner's experiences in a deliberate and thoughtful attempt to influence learning,"[10] it becomes clear that teachers need to use various teaching/learning strategies and make available a variety of environments to accommodate learning preferences. This approach would help strengthen style preferences of learners without handicapping those with styles different from the instructor's dominant mode. Some even suggest using the understanding of the style characteristics to individualize the approach to students in a small group, such as during ward rounds[11].

Although some studies have found no relationships with specific methods preferred and LSI categories[2,3,8], a study using other instruments found all residents across five medical areas, including pediatrics, to prefer concrete learning experiences, and learning with others was preferred more by residents in pediatrics than those in other disciplines[12]. Although the research on congruence of learning style and learning method preferences have been inconclusive, there have been indications for approaches for each of the styles[13]. CE's style is more likely supported by demonstrations, laboratories and examples; RO's by brainstorming, discussion and journal keeping; AC's by lectures, papers and model building; and AE 's by field work,

simulations, and case studies. Choices of processes for reaching the same goals would allow the students to individualize their programs and capitalize on their strengths. The Kolb model can provide a framework for systematic planning of activities which represent each point on the experiential cycle[13].

Since teaching and learning are two sides of the same coin, faculty need to be cognizant that their preferred teaching style may not be compatible with some of their students' preferred styles. An informal assessment in one study[14] found those with similar styles communicated better; those with diametrically opposed learning styles were less likely to achieve instructional rapport. In relation to the findings presented in this paper, it may be, then, that generalists and specialists may have the same problem. For instance, an AE (doer and risk-taker) may perceive an AC (systematic thinker-planner) as aloof and unyielding and feel uncomfortable approaching with a problem. The AC in turn, may view the AE as a trouble maker and rule breaker, or the CE (present-oriented feelers) as pushy and impatient. An RO (questioner, information gatherer) may be typified as an idealistic dreamer, although his perseverance may finally find the best answer. Faculty exposure to the learning style concept can help to mitigate negative reactions to differences.

Faculty development can focus on planning for and/or adapting to the needs and preferences of learners. The question has been posed as to whether faculty can learn to teach in ways which are incongruent with their own styles[15]. Since we all engage in all of the strategies to some degree, it seems to be more a matter of willingness to learn, rather than ability. Kolb believes that as career paths evolve and the demands of

job roles become more complex, learning preferences may become more balanced. Many faculty may respond positively when given options and support for trying new methods with students. Faculty development and continuing education opportunities need to be offered which take into account the differences in teachers as well, building on their preferences, but giving experiences and practice with other strategies. In this way faculty development can model what is expected.

Supporting the Generalist Styles: Providing more primary care physicians has become a national mandate. The learning environment offered to prospective primary care physicians can play a significant role in attracting and retaining students in primary care fields. A learning process that nurtures and supports primary care doctors has been sorely neglected, often disparaged.

These concerns are not new. A 1975 study[8] reported that medical students with learning styles associated with primary care careers were dissatisfied with the basic sciences curriculum. They were influenced by concrete work experiences and role models rather than abstract memorization. Some even reported that if they showed an interest in primary care, they were strongly questioned by specialist faculty members. Many of those who entered medical school intending to go into family medicine or primary care changed their choices by the time they were seniors.

Advisors with similar learning styles might be helpful to primary care candidates while career choices are still in flux Primary care mentors/models may be important for keeping them on track. This matching for counseling may be particularly important during residency for students with a style different from most of those in the program.

Learning style preferences may indicate a predisposition for choosing a primary care career. Recruitment, admissions and retention policies can favor these primary care attributes. Selection committees may consider a student's application for a primary care career by including an assessment of the applicants' activities, interests and learning style preferences. Dominant preferences for Concrete Experience and Active Experimentation might serve as signposts for persons who will value the role of a generalist.

CONCLUSIONS

1) There were significant differences in dominant learning modes between residents and a primarily subspecialist pediatric faculty, and between elementary and secondary teachers in the two studies reported. 2) The "generalists," residents and elementary teachers, were alike in dominant modes of learning and the "specialists," pediatric faculty and secondary teachers, were alike, supporting the generalist vs. subspecialist notion. 3) The notion of generalists vs. specialists in learning style preference was supported by other studies and encourages further research in medical settings.

Learning style studies can validate the need for particular experiences and approaches to primary care curriculum planning and teaching. They may be useful in improving teacher-learner relationships. Learning style characteristics may also have application to medical school recruitment, selection and retention processes.

REFERENCES

1. Kolb DA, *Experiential Learning:Experience as the Source of Learning and Development*. Prentice-Hall, Inc., 1984.

2. West RF. A Construct Validity Study of Kolb's Learning Style Types in Medical Education. *J. of Med. Educ.* 57(1982):794-796.

3. DeCoux V. Kolb's Learning Style Inventory:A Review of Its Applications in Nursing Research. *J. of Nursing Educ.* 29 (1990): 5:202-207.

4. Ferrell BG. A Factor Analytic Comparison of Four Learning Style Instruments. *J Educ. Psych.* 75 (l983):33-39.

5. Baker JD III, Reines HD and Wallace CT. Learning Style Analysis in Surgical Training. *Amer. Surgeon*, 51(1985)9:494-496.

6. Baker JD III, Wallace CT, Bryans WO and Klapthor LB. Analysis of learning style. *So Med J*, 78;12:1494-1497, 1985.

7. Whitney MA, and Caplan RM. Learning Styles and Instructional Preferences of Family Practice Physicians. *J. Med. Educ.* 53(1978):45- 54.

8. Plovnick MS. Primary Care Career Choice and Medical Student Learning Styles. *J. Med. Educ.* 50(1975):849-855.

9. Wunderlich R and Gjerde C. Another Look at Learning Style Inventory and Medical Career Choice. *J. Med. Educ.* 53(1978):45-54.

10. Lefrancois GR. *Psychology for Teaching*. Wadsworth Publishing, 1991.

11. Leonard A and Harris I. Learning Style in a Primary Care Internal Medicine Residency Program. *Arch. Intern. Med.* 139 (1979):872-875.

12. Jewett LS, Greenberg LW, Foley RP, Goldberg RM, Spiegel CT and Green C. Another Look at Career Choice and Learning Preferences. *J. Med. Educ.* 21(1987):244-249.

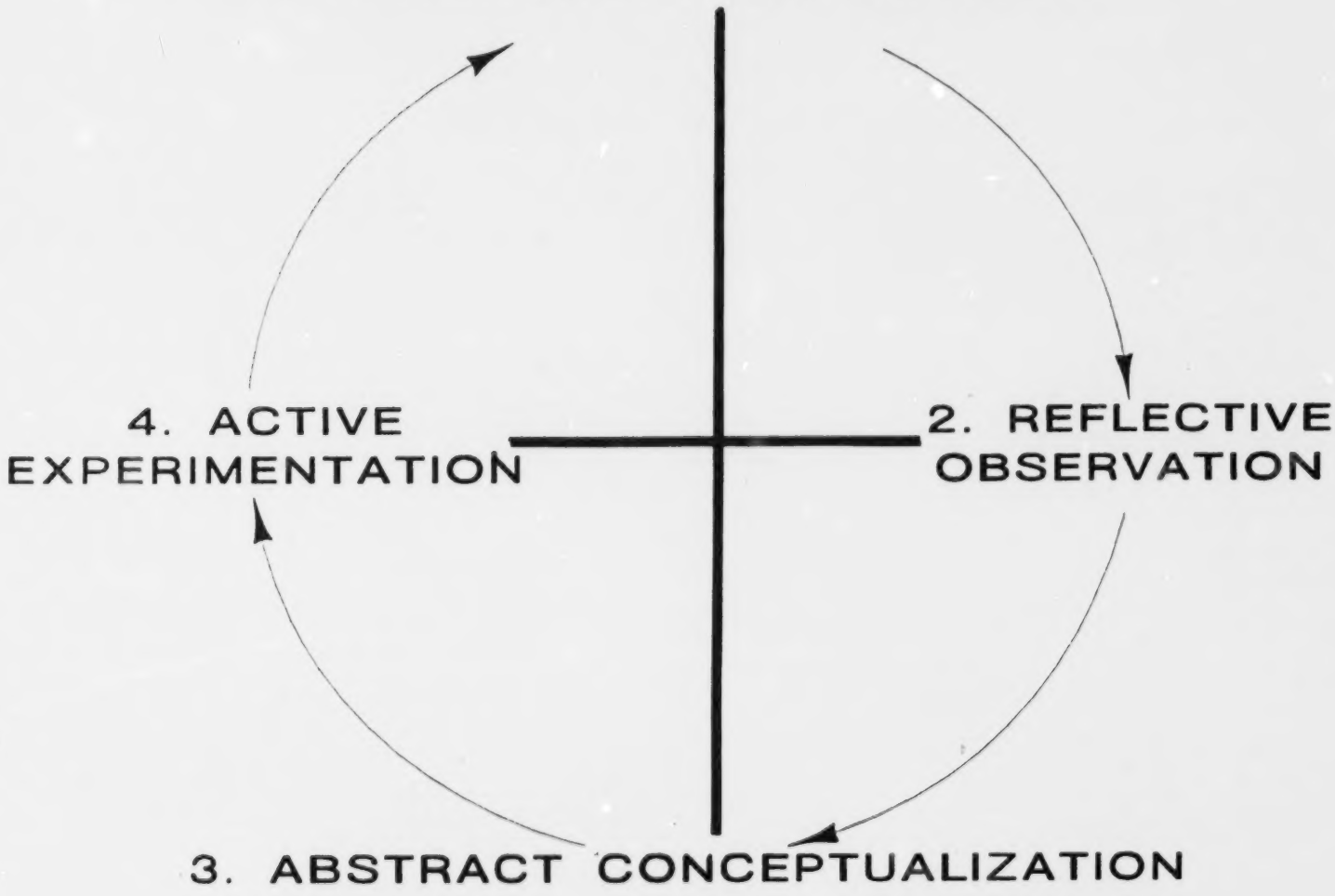
13. Svinicki MD and Dixon NM. The Kolb Model Modified for Classroom Activities. *College Teaching* 35 (1987)4:141-146.

14. Baker JD and Marks WE. Learning Style Analysis in Anesthesia Education *Anesthesioogy Review*, 8 (1981):31-4.Styles and Teaching Implications. *J .Med .Educ.* 53 (1978):847-849.

15. Sadler GR, Plovnick M and Slope FC. Learning Styles and Teaching Implications *J. Med. Educ.* 53 (1978):847-849.

Figure 1

EXPERIENTIAL LEARNING MODEL

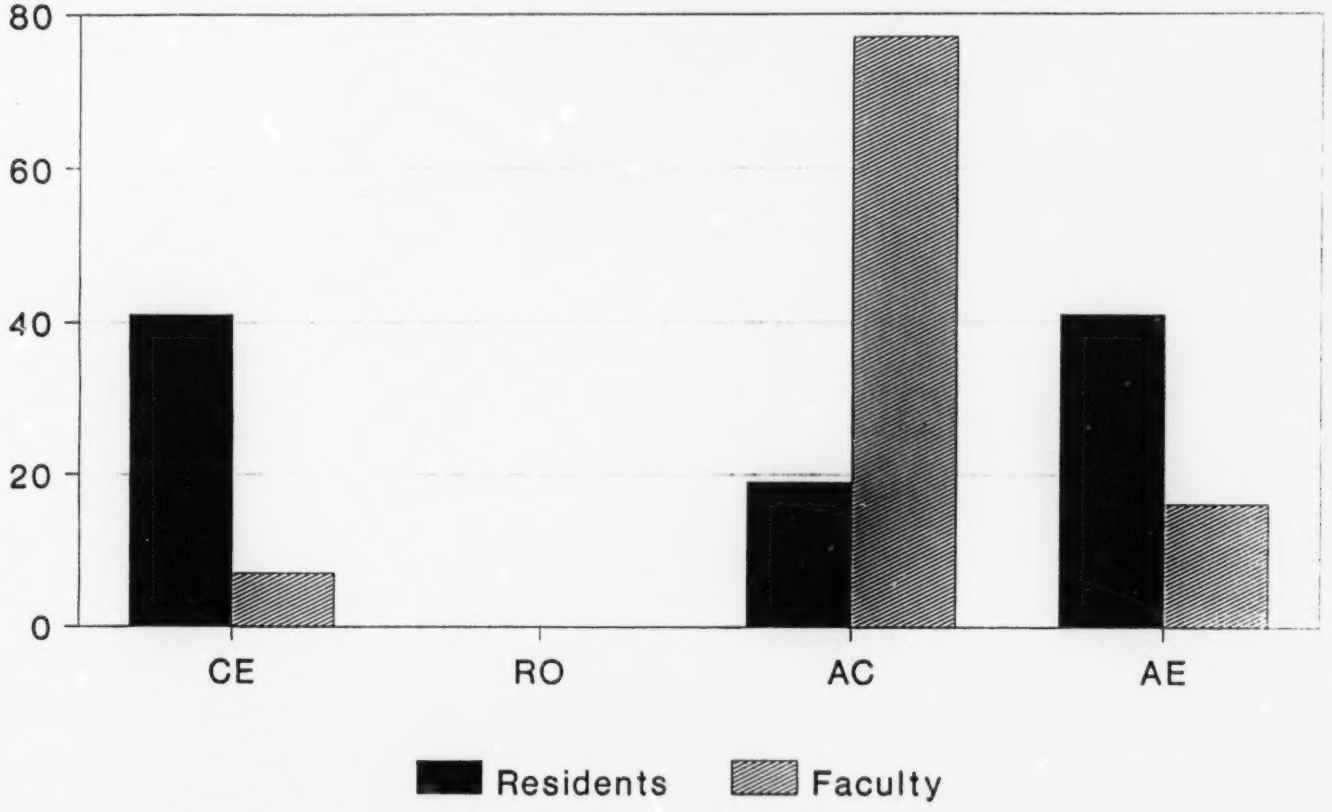


David Kolb

Figure 2

RESIDENTS/FACULTY COMPARISON

Percent of Group for Each Dominant Style

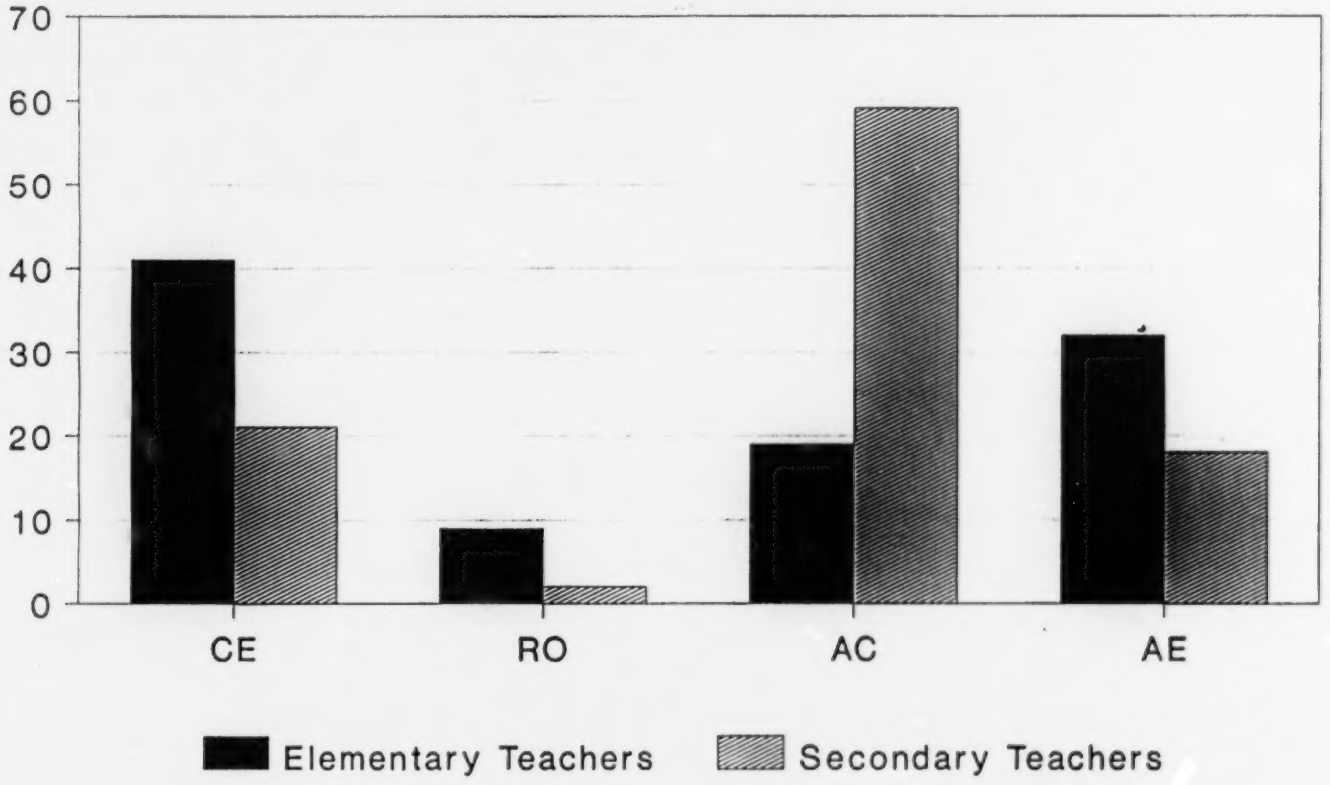


R N=16, F N=22

Figure 3

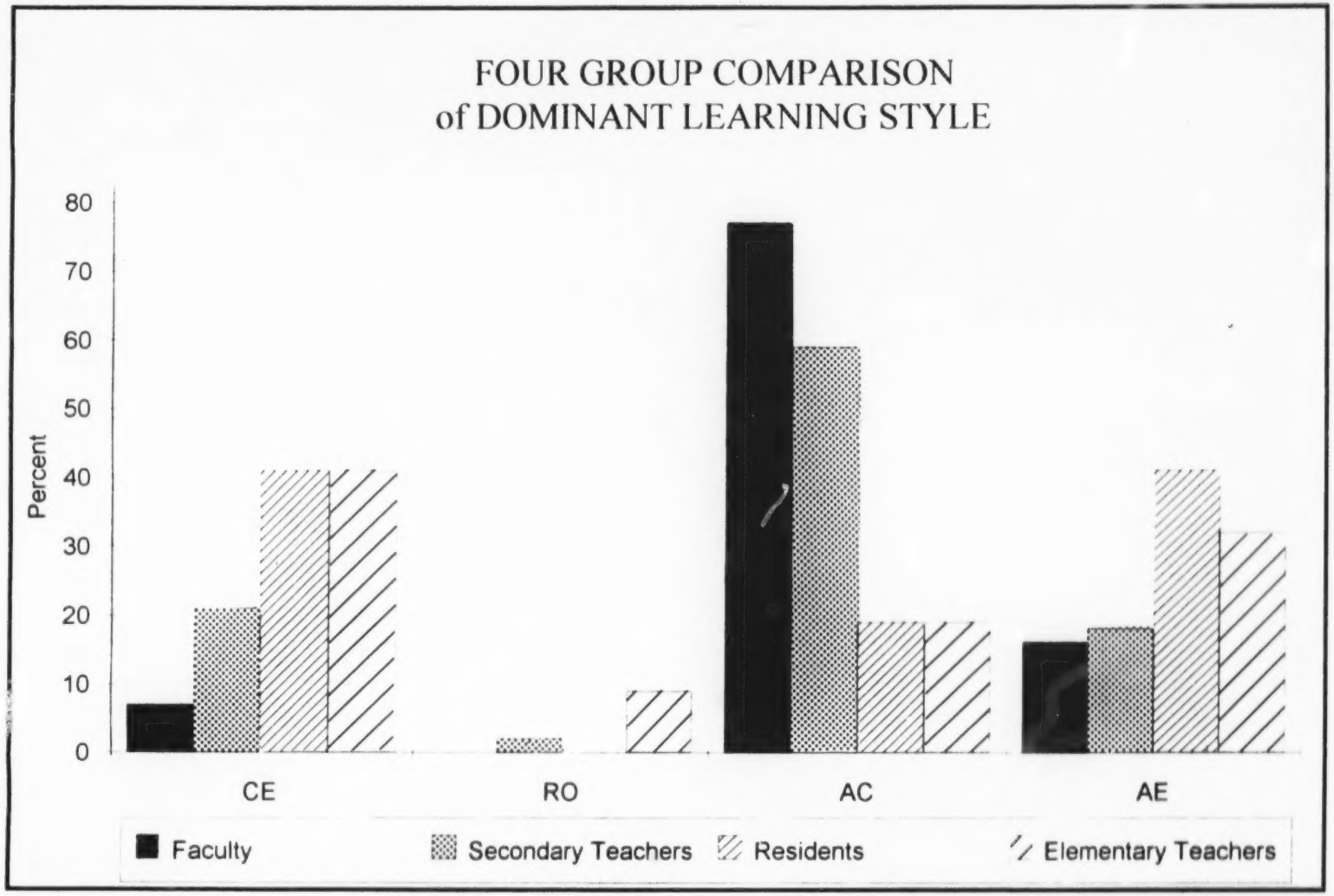
Elementary/Secondary Teachers

Percent of Group for Each Dominant Style



E N=33; S N=16

Figure 4


FOUR GROUP COMPARISON
of DOMINANT LEARNING STYLE
Percent
80
70
60
50
40
30
20
10
0
CE
RO
AC
AE
Faculty
Secondary Teachers
Residents
Elementary Teachers